WHAT IS CLAIMED IS:

1. An optical actuator comprising:

a solid light-absorbing and expanding member having an internal partially absorbing and partially reflecting cavity; and

a waveguide for directing optical energy into said partially absorbing and partially reflecting cavity.

2. The optical actuator of claim 1 wherein said partially absorbing and partially reflecting cavity has a longitudinal access, said actuator being displaced to a displacement distance along said longitudinal access, said displacement distance being proportional to the strength of a light signal input into said cavity, said displacement distance being proportional to the power of the input light signal.

3. The optical actuator of claim 1 wherein said partially absorbing and partially reflecting cavity is a closed cavity.

4. An optical actuator comprising:

an outer containing member; and

a cavity within said containing member, said cavity having a longitudinal axis and containing a light-absorbing and expanding material selected from the group consisting of liquids and polymers, said light-absorbing and expanding material expanding in response to light impinging thereon and thereby resulting in displacement of said light-actuated actuator to a displacement distance in the direction of said longitudinal access.

5. The optical actuator of claim 4 wherein said outer containing member is comprised of a material selected from the group consisting of metals, semiconductors, and dielectric material such as glass.

6. The optical actuator of claim 4 wherein said displacement distance is proportional to the power of said light impinging on said light-absorbing and expanding material.

7. An optical actuator comprising:

a first light-absorbing and expanding member comprising a first outer portion and a first cavity having a first longitudinal axis;

a second light-absorbing and expanding member comprising a second outer portion and a second cavity having a second longitudinal axis approximately parallel to said first longitudinal axis;

wherein absorption of light by one of said first light-absorbing cavity and said second light-absorbing cavity causes displacement of at least a portion of said optical actuator to a displacement distance in a direction approximately perpendicular to said first longitudinal axis and said second longitudinal axis.

8. The optical actuator of claim 7 wherein at least one of said first and second cavities is empty.

9. The optical actuator of claim 7 wherein at least one of said first and second cavities is filled with a material selected from the group consisting of liquids and polymers.

10. The optical actuator of claim 7 wherein said displacement distance is proportional to the power of said light absorbed by one of said first and second light-absorbing cavities.

11. The optical actuator of claim 7 wherein thermal changes in an environment of said optical actuator cause substantially no displacement of said optical actuator in a direction approximately perpendicular to said first longitudinal axis and said second longitudinal axis.

12. The optical actuator of claim 7 further comprising a first filter for filtering light input into said first light-absorbing and expanding member and a second filter for filtering light input into said second light-absorbing and expanding member, said filters allowing for controlled actuation of one or both of said first and second light-absorbing and expanding members via the input of multiple colors of light from a single light pathway.

13. The optical actuator of claim 12 wherein said single light pathway is a fiber optic cable.

14. The optical actuator of claim 12 wherein said single light pathway is an optical waveguide.

15. An optical actuator comprising:

a first light-absorbing and expanding member comprising a first outer portion and a first cavity having a first longitudinal axis;

a second light-absorbing and expanding member comprising a second outer portion and a second cavity having a second longitudinal axis approximately parallel to said first longitudinal axis;

a third light-absorbing and expanding member comprising a third outer portion and a third cavity having a third longitudinal axis approximately parallel to said first longitudinal axis; and

a fourth light-absorbing and expanding member comprising a fourth outer portion and a fourth cavity having a third longitudinal axis approximately parallel to said first longitudinal axis;

said first, second, third, and fourth light-absorbing and expanding members being approximately symmetrical and absorption of light at one or more of said first, second, third, and fourth light-absorbing members causes displacement of at least a portion of said optical actuator to a displacement distance in a direction approximately perpendicular to said first longitudinal axis.

16. The optical actuator of claim 15 wherein thermal changes in an environment of said optical actuator cause substantially no displacement of said optical actuator in a direction approximately perpendicular to said first longitudinal axis and said second longitudinal axis.

17. The optical actuator of claim 15 wherein said displacement distance is proportional to the optical power of said light absorbed at one or more of said light-absorbing members.

18. The optical actuator of claim 15 wherein said light-absorbing and expanding members are interconnected in a rigid frame and light input into two or more of said light-absorbing and expanding members allows for two-dimensional displacement of said optical actuator in directions approximately perpendicular to said first longitudinal axis.

19. The optical actuator of claim 15 further comprising:

a first filter for filtering light input into said first light-absorbing and expanding member;

a second filter for filtering light input into said second light-absorbing and expanding member;

a third filter for filtering light input into said third light-absorbing and expanding member; and

a fourth filter for filtering light input into said fourth light-absorbing and expanding member;

said filters allowing for controlled actuation of one or both of said first and second light-absorbing and expanding members via the input of multiple colors of light from a single light pathway.

20. The optical actuator of claim 19 wherein said single light pathway is a fiber optic cable.

21. The optical actuator of claim 19 wherein said single light pathway is an optical waveguide.

22. An optical attenuator comprising:

a light input-and-output aperture; and

a mirror having a rear portion comprising a first material having a first coefficient of thermal expansion and a front reflecting portion comprising a second material having a second coefficient of thermal expansion different from said first coefficient of thermal expansion;

wherein light impinging said front reflecting portion from said light input area causes said mirror to bend, thereby decreasing the amount of light reflected outwardly from said light input-and-output aperture.

23. The optical attenuator of claim 22 wherein said second coefficient of thermal expansion is greater than said first coefficient of thermal expansion.

24. The optical attenuator of claim 22 wherein said mirror changes its radius of curvature in response to impingement of said light.

25. The optical attenuator of claim 22 wherein said mirror changes its shape in response to impingement of said light.

26. The optical attenuator of claim 22 wherein said second coefficient of thermal expansion is less than said first coefficient of thermal expansion.

27. An optical actuator comprising:

a micro-mirror attached to a frame via two micro-flexures, said mirror having an axis of rotation and rotating in response to impingement of light upon said mirror at a distance from said axis of rotation.

28. A method of deflecting light comprising:

providing a micro-mirror attached to a frame via two micro-flexures, said mirror having an axis of rotation;

directing light toward said micro-mirror at a distance from said axis of rotation, said light causing a rotation of said micro-mirror thereby changing the direction of reflection of light beams from said micro-mirror.

29. The method of claim 28 wherein said micro-mirror is reflective on one side.

30. The method of claim 28 wherein said micro-mirror is reflective on first and second sides, said method further comprising directing a first light beam toward said first side of said micro-mirror and wherein directing light toward said micro-mirror at a distance from said axis of rotation comprises directing a second beam toward a second side of said mirror.

31. An optical actuator comprising:

a light-actuated member undergoing displacement to a first displacement distance in response to light impinging thereon; and

a lever connected to said light-actuated member, said lever having a hinge and a lever arm, a portion of said lever arm undergoing displacement to a second displacement distance, said second displacement distance being a multiple of said first displacement distance.

32. An optical actuator comprising:

a frame;

a bistable shell mounted within said frame, said bistable shell changing from a first stable shape within said frame to a second stable shape within said frame in reaction to the impingement of light on said bistable shell.

33. The optical actuator of claim 32 wherein said bistable shell has a cylindrically-rounded cross-section.

34. The optical actuator of claim 32 wherein said bistable shell has a spherically-rounded cross-section.